Docket No. 002664-9

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application of	)
Stefan KÄDING et al.	) Examiner Matthew J. Merkling
Application No. 10/596,616	) Group Art Unit 1795
Filing Date: June 19, 2006	) Confirmation No. 8463
For: REFORMER AND METHOD FOR REACTING FUEL AND OXIDANT TO REFORMATE	)))

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following arguments presented in support of the appeal instituted with a Notice of Appeal from the Final Office Action issued April 1, 2010, in connection with the above-captioned patent application, and subsequent to the panel decision in regard to a Request for Pre-Appeal Brief Review issued August 10, 2010.

(i) *Real party in interest.*

Webasto AG of Stockdorf, Germany is the real party in interest.

(ii) *Related appeals and interferences.*

None.

(iii) *Status of claims.*

Claims 13-16 and 18-21 are appealed. Claims 1-13, 17 & 22 are cancelled.

(iv) *Status of amendments.*

No amendments were filed after final rejection.

(v) *Summary of claimed subject matter.*

The invention set forth in independent claim 1 relates to a reformer (10, Fig. 1) for converting fuel (12, 14) and oxidant (16, 18, 20) into reformate (22) that has an oxidation zone (24) connected to a supply of fuel (12) and a supply of oxidant (16) and in which the fuel (12) and oxidant (16) are formed into an oxidized mixture. An injection and mixture forming zone (30) is connected between the oxidation zone (24) and a reforming zone (26) and at least a portion of the oxidized mixture (32) from the oxidation zone (24) is mixed with an injected supply of additional fuel (14) in the injection and mixture forming zone (30) and from which the mixture (32) with the additional fuel (14) is supplied to the reforming zone (26) upon an at least partial oxidation of the fuel. Furthermore, the reforming zone is connected to a source of heat (28) and a portion of the gas mixture (34) is supplied to the reforming zone from the oxidation zone (24) in a manner bypassing the injection and mixture forming zone (30).

The method of claim 18 is directed to the converting of fuel and oxidant into reformate in a reformer having an oxidation zone and a reforming zone, comprising the steps shown in part in the flow chart of Fig. 2, by which fuel (12) and oxidant (16) is supplied to the oxidation zone where it is formed into a mixture (step S01), upon at least partial oxidation of the fuel (16; step S02), at least a portion of the mixture (32) is delivered to an injection and mixing zone (30, step S03) in which the mixture (32) is mixed with an injected supply of additional fuel (14, step S04). The mixture (32) with the additional fuel (14) is then supplied to the reforming zone (26, S05) where mixture (32) is at least partially converting the mixture into reformate using added heat (step S06) and a portion of the mixture produced in the oxidation zone (34) is supplied to the reforming zone (30) in a manner bypassing the injection and mixture forming zone (paragraph [0026], next-to-last sentence).

(vi) *Grounds of rejection to be reviewed on appeal.*

Claims 13-15 and 18-21 stand rejected under 35 USC § 103 as being unpatentable over the Sennoun et al. patent (hereafter, "Sennoun") when viewed in combination with the Marchand et al. patent application publication (hereafter, "Marchand").

Claim 16 stands rejected under 35 USC § 103 as being unpatentable over Sennoun when viewed in combination with Marchand and the Kudo et al. patent (hereafter, "Kudo").

(vii) *Argument.*

Rejection of Claims 13-15 and 18-21 over Sennoun when viewed in combination with Marchand.

As acknowledged by the Examiner, neither Sennoun nor Marchand discloses having a portion of the mixture produced in the oxidation zone supplied to the reforming zone in a manner bypassing the injection and mixture forming zone or any means for doing so. However, in recognition of the fact that this is a claimed feature of the present invention that has been argued as a basis for patentability, the Examiner has asserted that Marchand teaches the desirability of direct heat exchange of the catalyst and that would lead one of ordinary skill to provide Sennoun's device and method with a bypass passage to allow the mixed gas stream to pass directly from the oxidation zone to the reforming zone to provide a faster heatup of the catalyst. However, it is submitted that the Examiner has over-generalized the teachings of Marchand, and in doing so, he has mischaracterized what this reference might suggest to one of ordinary skill. Moreover, since Marchand does not teach use of a bypass, the Examiner has failed to meet his initial burden of establishing a *prima facie* case of obviousness because the Examiner has provided no explanation as to why Marchand's teaching would lead one of ordinary skill to use a bypass in a way that neither applied reference does, and especially since direct heat exchange already occurs in the device of Sennoun without the use of a bypass (see, for example, column 5, lines 20-23 and the last sentence of the second full paragraph). That is, where is there a recognition by either Sennoun or Marchand that a bypass would provide a better result than the direct heat exchange already present in Sennoun's device?

Furthermore, according to Marchand additional oxidant can be fed during a start up phase at different points to accelerate the startup phase by exothermic reactions. In paragraph [0109] Marchand points out that this preheating is via an "additional direct heat source" that is not restricted by the thermal conductivity of the surrounding material. However, the disclosed manners of providing an "additional direct heat source" do not involve providing a bypass of the type disclosed and claimed in the present application. To the contrary

Marchand describes very different means for providing an "additional direct heat source" in paragraph [0111] where it is described that such means can be provided by, for example:

> the tops of the reformer tube(s) may be heated externally by combustion gases from the reformer burner. After the tops of the reformer tube(s) have reached a suitable temperature, fuel and oxidant (and optionally, steam) are directed to the reformer tube(s). Ignition of the catalytic combustion reaction occurs when the reactant gases come into contact with the heated reformer tube walls near the top of the tube. By controlling the flow rate of the reactant gases, the reaction front can propagate back to the front portion of the bed, heating the entire catalyst bed. Other methods of heating at least a portion of the catalyst bed may also be suitable depending on the design and construction of the steam reformer. For example, a heating device, such as a resistive heating element, igniter, or glow plug could be placed within or near the catalyst bed, if desired.

None of these additionally heating means involve the use of a bypass, and they even could be said to teach away from the use of a bypass (a point argued to the Examiner and not addressed by him). Furthermore, Figs. 1 to 6 describe additional oxidant supplies at different entrance points near the different catalysts where the exothermic catalytic combustions take place. Such a showing by Marchand teaches something that resembles several injection and mixture forming zones and not the bypassing of a portion of the mixture produced in the oxidation zone according to claims 13 and 18 of the present patent application.

Providing a reformer and method as disclosed and claimed herein with the recited "bypassing feature" is particularly advantageous, since gas mixtures of different compositions can be transferred from the oxidation zone into the reforming zone. On this basis, different paths for the gas mixture from the oxidation zone to the reforming zone are available, namely, either via the injection and mixture forming zone or via various bypassing connections between the oxidation zone and the reforming zone. Transferring a gas mixture from an upstream point of the oxidation zone to a downstream point of the reforming zone has a different influence on the reforming than transferring a gas mixture from a downstream point of the oxidation zone to an upstream point of the reforming zone (another point argued to the Examiner and not addressed by him). This advantage is not recognized by either reference nor is any other reason evident as to why a technique not recognized to be suitable or advantageous by either reference would be adopted without impermissible hindsight use of applicants' own disclosure.

The Examiner has merely asserted, without supporting basis, that "the concept of Marchand is sufficient to lead one of ordinary skill in the art to direct at least a portion of the gas mixture directly (bypassing all other areas of the apparatus) to the reforming catalyst to expedite the heatup of the reforming catalyst and commence the reforming reaction." However, unexplained by the Examiner is how or why this is the case when a bypass technique is neither taught by these references nor is equivalent to that which is taught by them. It is submitted that the Examiner is essentially taking an approach that has been discredited by both the Board and the Federal Circuit, i.e., equating that which is within the capabilities of one skilled in the art with obviousness. See, *Ex parte Gerlach and Woerner*, 212 USPQ 471 (1980) "There is nothing in the statutes or the case law which makes 'that which is within the capabilities of one skilled in the art' synonymous with obviousness" and *In re Gordon*, 221 USPQ 1125 (1984) in which the Federal Circuit pointed out that the mere fact that a modification could be made does not make it obvious absent a teaching of the desirability to do so. Moreover, the Supreme Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that "'[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'" in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). Here, nothing more than a conclusory statement has been provided by the Examiner, there being no rational underpinning supporting his conclusion of obviousness.

Additionally, while it is recognized that the actions of other patent offices are not binding on the Examiner, it is indicative of the unobviousness of the present invention that the present claims correspond substantially to the subject matter on which patents have been granted by the German, Australian and Korean Patent Offices, a fact point out to the Examiner but given no consideration.

For all of the above reasons, it is submitted that the § 103 rejection based upon the Sennoun and Marchand references should be reversed and action by the Board to that effect is requested.

Rejection of claim 16 under 35 USC § 103 as being unpatentable over Sennoun when viewed in combination with the Kudo et al. patent.

However, since Kudo contains no teachings suggestive of applicants' claimed bypassing of the injection and mixture forming zone, and in fact, reinforces appellants' position that the a general teaching of direct heat exchange as serves as the basis of the Examiner's assertion of obviousness would not lead to the claimed invention. In particular, Kudo, like Sennoun, provides for heat transference without the use of a bypass (see, e.g., column 12, second full paragraph). Furthermore, the presence of the partition wall 8 in the Fig. 1 embodiment for controlling heat transfer results in an arrangement in which the oxidation zone is located inward of the reforming zone, but not one in which the "oxidation zone comprises at least one pipe which is arranged ***within*** the reforming zone" and one of ordinary skill would not reverse the relationship between the oxidation and reforming zones of Sennoun based upon Kudo without including the presence of such a partition wall. Thus, this rejection should also be reversed.

Conclusion

For all of the above reasons, the Examiner's rejections should be reversed and such action by the board is requested.

Respectfully submitted,

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(viii) *Claims appendix.*

Claims 1-12 (Cancelled).

13. A reformer for converting fuel and oxidant into reformate, comprising:

an oxidation zone connected to a supply of fuel and a supply of oxidant and in which the fuel and oxidant are formed into an oxidized mixture;

a reforming zone, and

an injection and mixture forming zone between the oxidation zone and the reforming zone to which at least a portion of the oxidized mixture from the oxidation zone is mixed with an injected supply of additional fuel and from which the mixture with the additional fuel is supplied to the reforming zone upon an at least partial oxidation of the fuel;

wherein the reforming zone is connected to a source of heat; and

wherein the oxidation zone is constructed and arranged to enable a portion of the gas mixture to be supplied to the reforming zone in a manner bypassing the injection and mixture forming zone.

14. The reformer according to claim 13, wherein the source of heat is an exothermic oxidation produced within the oxidation zone.

15. The reformer according to claim 13, wherein the reforming zone is connected to an oxidant supply which supplies additional oxidant to the reforming zone.

16. The reformer according to claim 13, wherein the oxidation zone comprises at least one pipe which is arranged within the reforming zone.

17. (Cancelled).

18. A method for converting fuel and oxidant into reformate in a reformer having an oxidation zone and a reforming zone, comprising the steps of:

supplying fuel and oxidant to the oxidation zone and forming a mixture thereof therein,

upon at least partial oxidation of the fuel, delivering at least a portion of the mixture to an injection and mixing zone in which the mixture is mixed with an injected supply of additional fuel,

supplying the mixture with the additional fuel to the reforming zone, [[and]]

supplying heat to the reforming zone and at least partially converting the mixture into reformate; and

wherein a portion of the mixture produced in the oxidation zone is supplied to the reforming zone in a manner bypassing the injection and mixture forming zone.

19. The method according to claim 18, wherein the step of supplying heat to the reforming zone is performed with heat from exothermic oxidation of the fuel and oxidant mixture within the oxidation zone.

20. The method according to claim 18, further comprising the step of supplying additional oxidant to the reforming zone.

21. The method according to claim 18, wherein the additional fuel is at least partially evaporated by thermal energy of the gas mixture delivered to the injection and mixing zone from the oxidation zone.

22. (Cancelled).

(ix) *Evidence appendix.*

None.

(x) *Related proceedings appendix.*

None.